PATENT ABSTRACTS OF JAPAN

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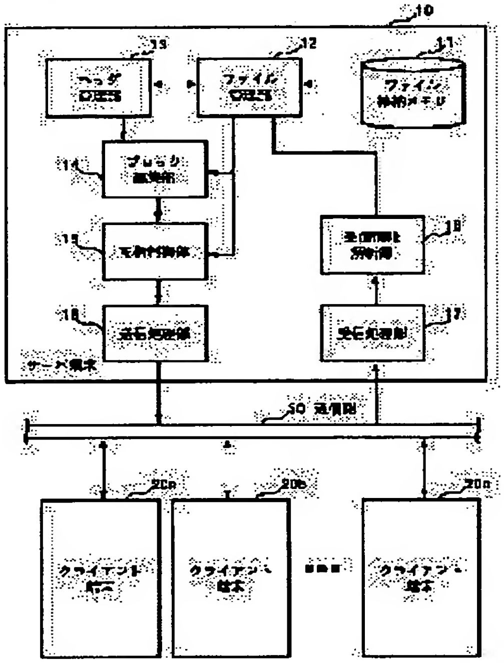
(54) FILE DISTRIBUTION METHOD AND COMMUNICATION CONTROLLER

(57)Abstract:

PROBLEM TO BE SOLVED: To improve the reliability and distribution efficiency of a distributed file at the time of distributing the file from a server terminal to plural client terminals.

SOLUTION: The server terminal 10 divides a distribution object file into plural blocks and simultaneously transmits them to the plural client terminals 20a-20n. The client terminals 20a... store the respective blocks in a prescribed order, construct at least a part of the file and write the constructed part of the file in a memory for storing the file asynchronously with the block storage. Also, the sequence of the already received blocks is discriminated, the presence/ absence of non-received blocks are judged, and in the case that the non-received block is present, a retransmission request is transmitted to the server terminal 10. The server terminal 10 judges whether it is simultaneous retransmission or individual retransmission based on the number of the retransmission requests and the contents of the retransmission request and retransmits the non-received block by a unit corresponding to a judged result.



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CLAIMS

[Claim(s)]
[Claim 1] The phase which broadcasts each block from a file transmit terminal to a multiple-files accepting station with the division sequence information while dividing the file for distribution into two or more blocks, The step which each file accepting station which received said block is accumulated in the sequence that said division sequence information defines each block, and builds said a part of file [at least] for distribution, Are recording of this block, and the step which writes the construction part of said file for distribution in the memory for file storing asynchronous, The step which distinguishes the sequentiality of an existing receiving block and judges the existence of the non-receiving block in a predetermined period, The phase of transmitting the resending demand about this non-receiving block to said file transmit terminal when there is a non-receiving block, The file distribution approach characterized by the file transmit terminal which received said resending demand having the phase of performing resending processing according to the number of these resending demands, and the content of the resending demand.

[Claim 2] The step which judges the existence of a non-receiving block in said file accepting station is the file distribution approach according to claim 1 characterized by including the process in which the division sequence information corresponding to this expected value is held until it receives an applicable block when the division sequence information on the consecutiveness receiving block following the receiving block of 1 is not expected value.
[Claim 3] The means which matches each division sequence information with each block while being equipment which performs two-way communication between multiple-files accepting stations and dividing the file for distribution into two or more blocks, The transmitting means which broadcasts or transmits [individual] said divided block to each file accepting station with said division sequence information, A block specification means to specify the block corresponding to this resending demand based on said division sequence information when the resending demand from at least one file accepting station is received, The communication controller which is equipped with a means to compare with a predetermined reference value the judgment information containing the number of the blocks specified with this block specification means, or the number of said resending demands, and to perform resending processing according to a comparison result, and changes.
[Claim 4] The means which matches each division sequence information with each block while dividing the file for distribution into two or more blocks, The memory for file storing for being equipment which performs two-way communication between ******** file transmit terminals, and storing said file for distribution, While accumulating two or more buffer memory for accumulating said block, and two or more blocks received from said file transmit terminal in said buffer memory in predetermined sequence and building said a part of file [at least] for distribution The memory control means which stores in said memory for file storing the construction part of the file for distribution accumulated in the buffer memory of 1 asynchronous [of said block / are recording and asynchronous], A receiving block monitor means to compare the division sequence information and the existing receiving block which received with two or more blocks from said file transmit terminal, and to detect a non-receiving block, The communication controller which is equipped with a transmitting means to transmit the resending demand about this non-receiving block to said file transmit terminal when this receiving block monitor means detects a non-receiving block, and changes.
[Claim 5] Said memory control means is a communication controller according to claim 4 characterized by moving to said memory for file storing the construction part of the file for distribution accumulated in said buffer memory of 1 while accumulating a consecutive receiving block in other buffer memory, after the block accumulated in the buffer memory of 1 reaches the specified quantity.
[Claim 6] Said receiving block monitor means is a communication controller according to claim 5 characterized by holding the division sequence information corresponding to this expected value until it

receives an applicable block when the division sequence information on the consecutiveness receiving block which supervises the division sequence information on each receiving block, and follows the receiving block of 1 is not expected value.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the file distribution technique in the client-server system by which network construction was carried out for example, using the TCP/IP protocol.
[0002]
[Description of the Prior Art] In the client/server system to which two or more client terminals are connected to one server terminal, when a file was distributed towards each client terminal using a TCP/IP protocol from a server terminal, two kinds of following methods were adopted conventionally. The 1st method is an individual distribution method and distributes a file to each client terminal individually from a server terminal. It is necessary to publish the file (file for distribution) which serves as an object for distribution as a premise several client terminal minutes by this method. On the other hand, the 2nd method is a broadcasting method and, unlike an individual distribution method, a server terminal carries out simultaneous distribution of the one file towards many and unspecified client terminals.
[0003] Both methods may divide the file for distribution into the block of predetermined length by the server terminal side, and may be distributed to a client terminal per block. From becoming [in the case of an individual distribution method] the size /1 block length of the file for distribution in the case of the number of size /1 block-length x client terminals of the file for distribution, and a broadcasting method, if the number of wording of a telegram estimates the rating in the server terminal in this case, if the size and 1 block length of the file for distribution of a formula are both equal, clearly, the burden to a system will have few broadcasting methods, and it will end. Therefore, if this broadcasting method is adopted, there is an advantage on which relief of the load in channels, such as LAN (regional network), and improvement in working efficiency are achieved.
[0004]
[Problem(s) to be Solved by the Invention] However, when a broadcasting method was adopted, there was a problem that the transmitting block from a server terminal could not always receive correctly at a client terminal depending on the throughput by the side of a client terminal or the condition of a channel. For example, in each client terminal, when arrival of the distributed consecutiveness block is earlier than are recording of the received block when the buffer memory (message buffer etc.) for accumulating a receiving block does not have sufficient capacity to accumulate the consecutiveness block length, and the accumulated processing about a block, reception of a consecutiveness block goes wrong and it is generated in a block omission. Conventionally, since the compensation technique for such a block omission was not enough, the dependability of the file distributed was not able to be raised.
[0005] Moreover, since it was not able to grasp which client terminal of a server terminal is in what kind of receiving situation now in the case of a broadcasting method, timing of the next file distribution could not be judged appropriately, but there was also a problem that distribution effectiveness could not be raised.
[0006] It is to offer the file distribution approach which enables efficient distribution while it raises the dependability of the reception file in each client terminal, in case the technical problem of this invention distributes a file by the broadcasting method towards two or more client terminals from a server terminal. Other technical problems of this invention are to offer the communication controller suitable for operation of the above-mentioned file distribution approach.
[0007]
[Means for Solving the Problem] The phase which broadcasts each block from a file transmit terminal to a multiple-files accepting station with the division sequence information while the file distribution approach which this invention offers divides the file for distribution into two or more blocks, The step which each file accepting station which received said block is accumulated in the sequence that said division sequence information defines each block, and builds said a part of file [at least] for distribution, Are recording of

storing asynchronous, The step which distinguishes the sequentiality of an existing receiving block and judges the existence of the non-receiving block in a predetermined period, The phase of transmitting the resending demand about this non-receiving block to said file transmit terminal when there is a non-receiving block, The file transmit terminal which received said resending demand is characterized by having the phase of determining at least one side of resending processing, for example, a resending place, and the resending block count according to the number of these resending demands, and the content of the resending demand.

[0008] When the division sequence information on the consecutiveness receiving block following the receiving block of 1 is not expected value, the step which judges the existence of a non-receiving block in the above-mentioned aforementioned file accepting station includes the process in which the division sequence information corresponding to this expected value is held until it receives an applicable block.

[0009] Moreover, the 1st communication controller which this invention offers The means which matches each division sequence information with each block while being equipment which functions as a file transmit terminal which performs two-way communication between multiple-files accepting stations and dividing the file for distribution into two or more blocks, The transmitting means which broadcasts or transmits [individual] said divided block to each file accepting station with said division sequence information, A block specification means to specify the block corresponding to this resending demand based on said division sequence information when the resending demand from at least one file accepting station is received, The judgment information containing the number of the blocks specified with this block specification means or the number of said resending demands is compared with a predetermined reference value, and it has a means to perform resending processing according to a comparison result, and changes.

[0010] Moreover, the 2nd communication controller which this invention offers The means which matches each division sequence information with each block while dividing the file for distribution into two or more blocks, The memory for file storing for being equipment which functions as a file accepting station which performs two-way communication between ******** file transmit terminals, and storing said file for distribution, While accumulating two or more buffer memory for accumulating said block, and two or more blocks received from said file transmit terminal in said buffer memory in predetermined sequence and building said a part of file [at least] for distribution The memory control means which stores in said memory for file storing the construction part of the file for distribution accumulated in the buffer memory of 1 asynchronous [of said block / are recording and asynchronous], A receiving block monitor means to compare the division sequence information and the existing receiving block which received with two or more blocks from said file transmit terminal, and to detect a non-receiving block, When this receiving block monitor means detects a non-receiving block, it has a transmitting means to transmit the resending demand about this non-receiving block to said file transmit terminal, and changes.

[0011] Said memory control means for example, after the block accumulated in the buffer memory of 1 reaches the specified quantity It is what is constituted so that the construction part of the file for distribution accumulated in said buffer memory of 1 may be moved to said memory for file storing, while accumulating a consecutive receiving block in other buffer memory. Said receiving block monitor means for example, when the division sequence information on the consecutiveness receiving block which supervises the division sequence information on each receiving block, and follows the receiving block of 1 is not expected value It constitutes so that the division sequence information corresponding to this expected value may be held, until it receives an applicable block.

[0012]

[Embodiment of the Invention] One operation gestalt at the time of applying the file distribution approach of this invention to the client-server system which used the TCP/IP protocol hereafter is explained to a detail.

[0013] Drawing 1 is system configuration drawing by this operation gestalt, and the server terminal 10 which is the 1st CCE, and two or more client terminals 20a-20n which are the 2nd CCE are connected through the channels 30, such as LAN. In relation with this invention, the server terminal 10 and a file accepting station correspond [a file transmit terminal] to the client terminals 20a-20n. The server terminal 10 has realized the function of the file management section 12, the header Management Department 13, the block editorial department 14, the distribution control section 15, the transmitting processing section 16, the reception section 17, and the receipt information analysis section 18 with the predetermined control program.

[0014] The file management section 12 extracts the file which serves as an object for distribution from the file storing memory 11, and it generates division sequence information while dividing into two or more blocks of the die length which does not cause fragmentation in the case of broadcasting of the file which extracted. Division sequence information is the information containing the file name and the division sequence number of a dividing agency. This division sequence information is sent to the header

Management Department 13, and matching with each block is made here. The file management section 12 performs resending control after file distribution again based on the analysis result sent from the below-mentioned receipt information analysis section 18. While specifically specifying the non-receiving block corresponding to a resending demand with reference to the division sequence information on each block managed at the header Management Department 13, when the whole number of non-receiving blocks or the number of resending demands exceeds a reference value (for example, when exceeding 20% of a whole block), control information for a broadcasting method to perform simultaneous resending for every file towards all the client terminals 20a-20n is generated. When the resending demand inclines toward the specific client terminal, or when concentrating on a specific block, the control information for performing simultaneous resending for every individual resending or simultaneous resending for every file, and block is generated. Each control information is sent to the distribution control section 15.
[0015] The block editorial department 14 edits each block and division sequence information, and generates the transmit information (resending information is included) of a format according to a TCP/IP protocol. The distribution control section 15 controls the distribution method of the transmit information in the transmitting processing section 16, or resending information based on the control information sent from the file management section 12. The reception section 17 receives the receipt information which each client terminals 20a-20n transmitted after file distribution, and the receipt information analysis section 18 analyzes the content of the resending demand included in receipt information, and transmits it to the file management section 12.
[0016] Drawing 2 is the block diagram of the client terminal by this operation gestalt, and only 1st client terminal 20a is shown for convenience. Other client terminals 20b-20n serve as almost same configuration.

[0017] This client terminal 20a has realized the function of the reception section 21, the receiving block Monitoring Department 22, the memory control section 23, the serial number administration table 24, buffer memory (message memory) 25, the file storing memory 26, the resending demand information generation section 27, and the transmitting processing section 28 with the predetermined control program. The memory control section 23 consists of a table control section 231 which performs the store and **** of the serial number table 24, the buffer control section 232 which performs block are recording to buffer memory 25, change-over control of a write-in field, etc., and the write control section 233 which performs write control to the file storing memory 26.
[0018] The reception section 21 sends each receipt information to the memory control section 23 while receiving a block and the division sequence information on a header unit from a server terminal. About actuation of the memory control section 23, it mentions later. The receiving block Monitoring Department 22 notifies that to the resending demand information generation section 27, when the existence of the non-receiving block for every file is supervised based on the division sequence information from the reception section 21 and a non-receiving block is detected.
[0019] The serial number administration table 24 holds the block which was un-receiving as a "missing number" by control of the table control section 231. Various technique can be adopted about specification of the non-receiving block which used this serial number administration table 24. For example, all division sequence information is written in the serial number administration table 24 at the time of the simultaneous distribution from the server terminal 10, and whenever it receives a block, the division sequence information on a block is erased. The division sequence information which remained serves as a missing number showing a non-receiving block. Or at the time of the are recording to buffer memory 25, division sequence information judges whether it is expected value, and carries out sequential record of the division sequence information on the block which is not expected value as a missing number at it. When an applicable block is received behind, a corresponding missing number is erased. With this operation gestalt, the latter technique is adopted for convenience. Drawing 3 is the explanatory view showing the example of a content of this serial number administration table 24.
[0020] Buffer memory 25 reconstructs the file which carried out sequential are recording and was distributed to the recording surface which has at least two switchable recording surfaces selectively, and chose the received block by the buffer control section 232 from the server terminal 10. The file storing memory 26 is that of a peach which stores the file construction part accumulated in buffer memory 25.
[0021] Next, concrete actuation of the client-server system of the above-mentioned configuration is explained with reference to drawing 4 - drawing 8 . Drawing 4 is the procedure explanatory view showing the primary transmitting processing in the server terminal 10, i.e., the simultaneous message distribution processing by the broadcasting method. The server terminal 10 extracts the file for distribution from the file storing memory 11 first (S101). And while carrying out sequential division of the extracted file at the block in every 1024 bytes, division sequence information is generated (S102). The number which expresses division secuence information, i.e., a file name, and division sequence with the header of each block is given

(S503), and simultaneous distribution is carried out by the broadcasting method towards all the client terminals 20a-20n (S104). Steps S101-S105 are further repeated repeatedly (S105) until the file for distribution is lost, until all blocks end steps S101-S104 about the file concerned (S106). After primary transmitting processing performs resending processing in the procedure shown in drawing 5 if needed.

[0022] If the resending demand from at least one client terminal is first received in resending processing (S201:Yes). Simultaneous resending judges whether it is the need (S202). When there are more client terminals which transmitted the resending demand as mentioned above as a criterion than a reference value (for example, 20% of the whole), when there are more non-receiving blocks than a reference value (for example, 20% of the whole), simultaneous resending is performed (S203), and individual resending is performed except it (S204). A reference value can be set as arbitration according to the number of the file type for distribution, or client terminals.

[0023] Next, the order of a way of the block are recording processing in client terminal 20a is explained with reference to drawing 6 . Client terminal 20a receives the file for distribution sent from the server terminal 10 for every block (S301), and reads a file name and the division sequence number in the received header of a block (S302). It investigates whether with reference to the serial number administration table 24, the division sequence number of a receiving block exists as a missing number (S303). If it exists, the missing number will be deleted from the serial number administration table 24, and a receiving block will be accumulated in buffer memory 25 (S307). When it judges with there being no missing number in S303 (S303:No), this number judges whether it is an expected serial number (S305). Just before an "expected serial number" belongs to the same file, "6" in case the division sequence number of a receiving block is "5" corresponds.

[0024] It does not exist in the serial number administration table 24 as a missing number, and when it is not an expected serial number, either (S305:No), it writes in the serial number administration table 24 by making this into a missing number (S306), and a receiving block is accumulated in buffer memory 25 (S307). the case of an expected serial number — (S305:Yes) — a receiving block is promptly accumulated in buffer memory 25. In addition, although the case where this is written in the serial number administration table 24 is explained for convenience here when a missing number arises, you may be the technique erased one by one whenever it writes the division sequence information on the whole block of the consecutiveness to the time of reception of the first block in the serial number administration table 24 and receives each block as mentioned above.

[0025] The above processing is repeated about other blocks of a file (S308:No), and when it judges with reception of a whole block having been completed, it judges whether with reference to (S308:Yes) and the serial number administration table 24 (S309), there is any missing number left behind about the file concerned (S310). When the missing number is left behind, (S310:Yes) and it are read, resending demand information is generated (S311), and a resending demand is transmitted towards the server terminal 10 (S312). Henceforth, when resent from the server terminal 10, processing from S301 is performed again. Processing is finished when it judges with there being no missing number in S310 (S310:No).

[0026] Thus, since the block corresponding to a missing number is specified and it was made to carry out a resending demand at the server terminal 10 promptly even if it was the case where reception of a block of the part which constitutes the distributed file went wrong, the block omission at the time of simultaneous distribution being carried out can be prevented certainly, and the dependability of a reception file can be raised.

[0027] Next, in client terminal 20a, block are recording processing and the file write-in processing performed to asynchronous are explained with reference to drawing 7 . The buffer control section 232 chooses the recording surface of buffer memory 25, for example, the 1st page, and accumulates a receiving block to the applicable location of the 1st page, i.e., the location shown using division sequence information, (S401). This is connected with above-mentioned block are recording processing. The remaining capacity of the 1st page is investigated (S402), when not full, it judges whether there are (S402:No) and a consecutiveness block (S403), and when there is a consecutiveness block, the are recording to the 1st (S403:Yes) page is repeated. When the 1st page fills (S402:Yes) and there is a consecutiveness block, (S404:Yes) and the buffer control section 232 change a recording surface to the 2nd page, and accumulate a consecutiveness block in an applicable location (S405). After the 2nd-page are recording initiation when it judges with there being no consecutiveness block in S403 and S404, while the write control section 233 stores in the file storing memory 26 the block (construction part of a file) accumulated in the 1st page (S406), the 1st page is cleared in preparation for the next block are recording (S407). If it does in this way, since block are recording processing and file write-in processing are performed to mutually-independent timing, the block omission which originates in file write-in processing at least can be prevented, and also the utilization ratio of buffer memory 25 can be raised to the maximum.

[0028] In an above-mentioned client-server system, the resending mode after the server terminal 10 performs two or more blocks simultaneous distribution with a broadcasting method is shown in drawing 8 (a), (b), and (c).

[0029] Drawing 8 (a) shows the example when the resending demand which shows that the 1st client terminal A had not received the 21st block about a missing number "21", i.e., the file concerned, is transmitted and the 2nd client terminal B transmits the resending demand about a missing number "82." In this case, since there are few resending blocks, an applicable block "82" is individually resent to the 1st client terminal A at an applicable block "21" and the 2nd client terminal B. on the other hand — drawing 8 (b) — each client terminals A and B and .. it is an example when there are a number of resending demands which exceed the above-mentioned reference value from N. In this case, a broadcasting method performs simultaneous resending of the file concerned to all client terminals. Drawing 8 (c) is the example of combination of the above-mentioned example, performs simultaneous distribution only about a client terminal with many non-receiving blocks, and is made to perform individual resending to a client terminal with few non-receiving blocks.

[0030] Thus, the effectiveness of file distribution can be raised, being able to adopt a broadcasting method in a safe environment and mitigating the load of a server terminal or a channel, since the device which avoids that efficient recovery in case there being no guarantee of the risk in the case of adopting a broadcasting method, i.e., the sequentiality of wording of a telegram, at the client-server system of this operation gestalt and a wording-of-a-telegram omission occur cannot be performed etc. was realized. Moreover, since processing of this operation gestalt is automatable, the advantage of becoming possible to maintain intensively two or more client terminals of a remote place is also produced. In addition, although the above is explanation at the time of applying this invention to a client-server system, if it is the system which consists of the file transmit terminal which can adopt a broadcasting method, and a file accepting station, it cannot be overemphasized that this invention is similarly applicable.

[0031]

[Effect of the Invention] Since according to this invention sequentiality was given to wording of a telegram and the compensation in the case of generating of a wording-of-a-telegram omission was put into practice so that clearly from the above explanation, the dependability at the time of distributing a file by the broadcasting method can be raised to a file accepting station from a file transmit terminal. Consequently, the load to a channel is mitigated and a deployment becomes possible about a hard resource.

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the file distribution technique in the client-server system by which network construction was carried out for example, using the TCP/IP protocol.

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PRIOR ART

[Description of the Prior Art] In the client/server system to which two or more client terminals are connected to one server terminal, when a file was distributed towards each client terminal using a TCP/IP protocol from a server terminal, two kinds of following methods were adopted conventionally. The 1st method is an individual distribution method and distributes a file to each client terminal individually from a server terminal. It is necessary to publish the file (file for distribution) which serves as an object for distribution as a premise several client terminal minutes by this method. On the other hand, the 2nd method is a broadcasting method and, unlike an individual distribution method, a server terminal carries out simultaneous distribution of the one file towards many and unspecified client terminals.
[0003] Both methods may divide the file for distribution into the block of predetermined length by the server terminal side, and may be distributed to a client terminal per block. From becoming [in the case of an individual distribution method] the size /1 block length of the file for distribution in the case of the number of size /1 block-length x client terminals of the file for distribution, and a broadcasting method, if the number of wording of a telegram estimates the rating in the server terminal in this case, if the size and 1 block length of the file for distribution of a formula are both equal, clearly, the burden to a system will have few broadcasting methods, and it will end. Therefore, if this broadcasting method is adopted, there is an advantage on which relief of the load in channels, such as LAN (regional network), and improvement in working efficiency are achieved.

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EFFECT OF THE INVENTION

[Effect of the Invention] Since according to this invention sequentiality was given to wording of a telegram and the compensation in the case of generating of a wording-of-a-telegram omission was put into practice so that clearly from the above explanation, the dependability at the time of distributing a file by the broadcasting method can be raised to a file accepting station from a file transmit terminal. Consequently, the load to a channel is mitigated and a deployment becomes possible about a hard resource.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, when a broadcasting method was adopted, there was a problem that the transmitting block from a server terminal could not always receive correctly at a client terminal depending on the throughput by the side of a client terminal or the condition of a channel. For example, in each client terminal, when arrival of the distributed consecutiveness block is earlier than are recording of the received block when the buffer memory (message buffer etc.) for accumulating a receiving block does not have sufficient capacity to accumulate the consecutiveness block length, and the accumulated processing about a block, reception of a consecutiveness block goes wrong and it is generated in a block omission. Conventionally, since the compensation technique for such a block omission was not enough, the dependability of the file distributed was not able to be raised.
[0005] Moreover, since it was not able to grasp which client terminal of a server terminal is in what kind of receiving situation now in the case of a broadcasting method, timing of the next file distribution could not be judged appropriately, but there was also a problem that distribution effectiveness could not be raised.
[0006] It is to offer the file distribution approach which enables efficient distribution while it raises the dependability of the reception file in each client terminal, in case the technical problem of this invention distributes a file by the broadcasting method towards two or more client terminals from a server terminal. Other technical problems of this invention are to offer the communication controller suitable for operation of the above-mentioned file distribution approach.

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MEANS

[Means for Solving the Problem] The phase which broadcasts each block from a file transmit terminal to a multiple-files accepting station with the division sequence information while the file distribution approach which this invention offers divides the file for distribution into two or more blocks, The step which each file accepting station which received said block is accumulated in the sequence that said division sequence information defines each block, and builds said a part of file [at least] for distribution, Are recording of this block, and the step which writes the construction part of said file for distribution in the memory for file storing asynchronous, The step which distinguishes the sequentiality of an existing receiving block and judges the existence of the non-receiving block in a predetermined period, The phase of transmitting the resending demand about this non-receiving block to said file transmit terminal when there is a non-receiving block, The file transmit terminal which received said resending demand is characterized by having the phase of determining at least one side of resending processing, for example, a resending place, and the resending block count according to the number of these resending demands, and the content of the resending demand.
[0008] When the division sequence information on the consecutiveness receiving block following the receiving block of 1 is not expected value, the step which judges the existence of a non-receiving block in the above-mentioned aforementioned file accepting station includes the process in which the division sequence information corresponding to this expected value is held until it receives an applicable block.
[0009] Moreover, the 1st communication controller which this invention offers The means which matches each division sequence information with each block while being equipment which functions as a file transmit terminal which performs two-way communication between multiple-files accepting stations and dividing the file for distribution into two or more blocks, The transmitting means which broadcasts or transmits [individual] said divided block to each file accepting station with said division sequence information, A block specification means to specify the block corresponding to this resending demand based on said division sequence information when the resending demand from at least one file accepting station is received, The judgment information containing the number of the blocks specified with this block specification means or the number of said resending demands is compared with a predetermined reference value, and it has a means to perform resending processing according to a comparison result, and changes.
[0010] Moreover, the 2nd communication controller which this invention offers The means which matches each division sequence information with each block while dividing the file for distribution into two or more blocks, The memory for file storing for being equipment which functions as a file accepting station which performs two-way communication between ******** file transmit terminals, and storing said file for distribution, While accumulating two or more buffer memory for accumulating said block, and two or more blocks received from said file transmit terminal in said buffer memory in predetermined sequence and building said a part of file [at least] for distribution The memory control means which stores in said memory for file storing the construction part of the file for distribution accumulated in the buffer memory of 1 asynchronous [of said block / are recording and asynchronous], A receiving block monitor means to compare the division sequence information and the existing receiving block which received with two or more blocks from said file transmit terminal, and to detect a non-receiving block, When this receiving block monitor means detects a non-receiving block, it has a transmitting means to transmit the resending demand about this non-receiving block to said file transmit terminal, and changes.
[0011] Said memory control means for example, after the block accumulated in the buffer memory of 1 reaches the specified quantity It is what is constituted so that the construction part of the file for distribution accumulated in said buffer memory of 1 may be moved to said memory for file storing, while accumulating a consecutive receiving block in other buffer memory. Said receiving block monitor means for example, when the division sequence information on the consecutiveness receiving block which supervises the division sequence information on each receiving block, and follows the receiving block of 1 is not expected value It constitutes so that the division sequence information corresponding to this expected

value may be held, until it receives an applicable block.
[0012]
[Embodiment of the Invention] One operation gestalt at the time of applying the file distribution approach of this invention to the client-server system which used the TCP/IP protocol hereafter is explained to a detail.
[0013] Drawing 1 is system configuration drawing by this operation gestalt, and the server terminal 10 which is the 1st CCE, and two or more client terminals 20a-20n which are the 2nd CCE are connected through the channels 30, such as LAN. In relation with this invention, the server terminal 10 and a file accepting station correspond [a file transmit terminal] to the client terminals 20a-20n. The server terminal 10 has realized the function of the file management section 12, the header Management Department 13, the block editorial department 14, the distribution control section 15, the transmitting processing section 16, the reception section 17, and the receipt information analysis section 18 with the predetermined control program.
[0014] The file management section 12 extracts the file which serves as an object for distribution from the file storing memory 11, and it generates division sequence information while dividing into two or more blocks of the die length which does not cause fragmentation in the case of broadcasting of the file which extracted. Division sequence information is the information containing the file name and the division sequence number of a dividing agency. This division sequence information is sent to the header Management Department 13, and matching with each block is made here. The file management section 12 performs resending control after file distribution again based on the analysis result sent from the below-mentioned receipt information analysis section 18. While specifically specifying the non-receiving block corresponding to a resending demand with reference to the division sequence information on each block managed at the header Management Department 13, when the whole number of non-receiving blocks or the number of resending demands exceeds a reference value (for example, when exceeding 20% of a whole block), control information for a broadcasting method to perform simultaneous resending for every file towards all the client terminals 20a-20n is generated. When the resending demand inclines toward the specific client terminal, or when concentrating on a specific block, the control information for performing simultaneous resending for every individual resending or simultaneous resending for every file, and block is generated. Each control information is sent to the distribution control section 15.
[0015] The block editorial department 14 edits each block and division sequence information, and generates the transmit information (resending information is included) of a format according to a TCP/IP protocol. The distribution control section 15 controls the distribution method of the transmit information in the transmitting processing section 16, or resending information based on the control information sent from the file management section 12. The reception section 17 receives the receipt information which each client terminals 20a-20n transmitted after file distribution, and the receipt information analysis section 18 analyzes the content of the resending demand included in receipt information, and transmits it to the file management section 12.
[0016] Drawing 2 is the block diagram of the client terminal by this operation gestalt, and only 1st client terminal 20a is shown for convenience. Other client terminals 20b-20n serve as almost same configuration.

[0017] This client terminal 20a has realized the function of the reception section 21, the receiving block Monitoring Department 22, the memory control section 23, the serial number administration table 24, buffer memory (message memory) 25, the file storing memory 26, the resending demand information generation section 27, and the transmitting processing section 28 with the predetermined control program. The memory control section 23 consists of a table control section 231 which performs the store and **** of the serial number table 24, the buffer control section 232 which performs block are recording to buffer memory 25, change-over control of a write-in field, etc., and the write control section 233 which performs write control to the file storing memory 26.
[0018] The reception section 21 sends each receipt information to the memory control section 23 while receiving a block and the division sequence information on a header unit from a server terminal. About actuation of the memory control section 23, it mentions later. The receiving block Monitoring Department 22 notifies that to the resending demand information generation section 27, when the existence of the non-receiving block for every file is supervised based on the division sequence information from the reception section 21 and a non-receiving block is detected.
[0019] The serial number administration table 24 holds the block which was un-receiving as a "missing number" by control of the table control section 231. Various technique can be adopted about specification of the non-receiving block which used this serial number administration table 24. For example, all division sequence information is written in the serial number administration table 24 at the time of the simultaneous distribution from the server terminal 10, and whenever it receives a block, the division sequence

information on a block is erased. The division sequence information which remained serves as a missing number showing a non-receiving block. Or at the time of the are recording to buffer memory 25, division sequence information judges whether it is expected value, and carries out sequential record of the division sequence information on the block which is not expected value as a missing number at it. When an applicable block is received behind, a corresponding missing number is erased. With this operation gestalt, the latter technique is adopted for convenience. Drawing 3 is the explanatory view showing the example of a content of this serial number administration table 24.

[0020] Buffer memory 25 reconstructs the file which carried out sequential are recording and was distributed to the recording surface which has at least two switchable recording surfaces selectively, and chose the received block by the buffer control section 232 from the server terminal 10. The file storing memory 26 is that of a peach which stores the file construction part accumulated in buffer memory 25.

[0021] Next, concrete actuation of the client-server system of the above-mentioned configuration is explained with reference to drawing 4 - drawing 8 . Drawing 4 is the procedure explanatory view showing the primary transmitting processing in the server terminal 10, i.e., the simultaneous message distribution processing by the broadcasting method. The server terminal 10 extracts the file for distribution from the file storing memory 11 first (S101). And while carrying out sequential division of the extracted file at the block in every 1024 bytes, division sequence information is generated (S102). The number which expresses division sequence information, i.e., a file name, and division sequence with the header of each block is given (S503), and simultaneous distribution is carried out by the broadcasting method towards all the client terminals 20a-20n (S104). Steps S101-S105 are further repeated repeatedly (S105) until the file for distribution is lost, until all blocks end steps S101-S104 about the file concerned (S106). After primary transmitting processing performs resending processing in the procedure shown in drawing 5 if needed.

[0022] If the resending demand from at least one client terminal is first received in resending processing (S201:Yes). Simultaneous resending judges whether it is the need (S202). When there are more client terminals which transmitted the resending demand as mentioned above as a criterion than a reference value (for example, 20% of the whole), when there are more non-receiving blocks than a reference value (for example, 20% of the whole), simultaneous resending is performed (S203), and individual resending is performed except it (S204). A reference value can be set as arbitration according to the number of the file type for distribution, or client terminals.

[0023] Next, the order of a way of the block are recording processing in client terminal 20a is explained with reference to drawing 6 . Client terminal 20a receives the file for distribution sent from the server terminal 10 for every block (S301), and reads a file name and the division sequence number in the received header of a block (S302). It investigates whether with reference to the serial number administration table 24, the division sequence number of a receiving block exists as a missing number (S303). If it exists, the missing number will be deleted from the serial number administration table 24, and a receiving block will be accumulated in buffer memory 25 (S307). When it judges with there being no missing number in S303 (S303:No), this number judges whether it is an expected serial number (S305). Just before an "expected serial number" belongs to the same file, "6" in case the division sequence number of a receiving block is "5" corresponds.

[0024] It does not exist in the serial number administration table 24 as a missing number, and when it is not an expected serial number, either (S305:No), it writes in the serial number administration table 24 by making this into a missing number (S306), and a receiving block is accumulated in buffer memory 25 (S307). the case of an expected serial number — (S305:Yes) — a receiving block is promptly accumulated in buffer memory 25. In addition, although the case where this is written in the serial number administration table 24 is explained for convenience here when a missing number arises, you may be the technique erased one by one whenever it writes the division sequence information on the whole block of the consecutiveness to the time of reception of the first block in the serial number administration table 24 and receives each block as mentioned above.

[0025] The above processing is repeated about other blocks of a file (S308:No), and when it judges with reception of a whole block having been completed, it judges whether with reference to (S308:Yes) and the serial number administration table 24 (S309), there is any missing number left behind about the file concerned (S310). When the missing number is left behind, (S310:Yes) and it are read, resending demand information is generated (S311), and a resending demand is transmitted towards the server terminal 10 (S312). Henceforth, when resent from the server terminal 10, processing from S301 is performed again. Processing is finished when it judges with there being no missing number in S310 (S310:No).

[0026] Thus, since the block corresponding to a missing number is specified and it was made to carry out a resending demand at the server terminal 10 promptly even if it was the case where reception of a block of the part which constitutes the distributed file went wrong, the block omission at the time of simultaneous distribution being carried out can be prevented certainly, and the dependability of a reception file can be raised.

[0027] Next, in client terminal 20a, block are recording processing and the file write-in processing performed to asynchronous are explained with reference to drawing 7 . The buffer control section 232 chooses the recording surface of buffer memory 25, for example, the 1st page, and accumulates a receiving block to the applicable location of the 1st page, i.e., the location shown using division sequence information, (S401). This is connected with above-mentioned block are recording processing. The remaining capacity of the 1st page is investigated (S402), when not full, it judges whether there are (S402:No) and a consecutiveness block (S403), and when there is a consecutiveness block, the are recording to the 1st (S403:Yes) page is repeated. When the 1st page fills (S402:Yes) and there is a consecutiveness block, (S404:Yes) and the buffer control section 232 change a recording surface to the 2nd page, and accumulate a consecutiveness block in an applicable location (S405). After the 2nd-page are recording initiation when it judges with there being no consecutiveness block in S403 and S404, while the write control section 233 stores in the file storing memory 26 the block (construction part of a file) accumulated in the 1st page (S406), the 1st page is cleared in preparation for the next block are recording (S407). If it does in this way, since block are recording processing and file write-in processing are performed to mutually-independent timing, the block omission which originates in file write-in processing at least can be prevented, and also the utilization ratio of buffer memory 25 can be raised to the maximum.

[0028] In an above-mentioned client-server system, the resending mode after the server terminal 10 performs two or more blocks simultaneous distribution with a broadcasting method is shown in drawing 8 (a), (b), and (c).

[0029] Drawing 8 (a) shows the example when the resending demand which shows that the 1st client terminal A had not received the 21st block about a missing number "21", i.e., the file concerned, is transmitted and the 2nd client terminal B transmits the resending demand about a missing number "82." In this case, since there are few resending blocks, an applicable block "82" is individually resent to the 1st client terminal A at an applicable block "21" and the 2nd client terminal B. on the other hand — drawing 8 (b) — each client terminals A and B and .. it is an example when there are a number of resending demands which exceed the above-mentioned reference value from N. In this case, a broadcasting method performs simultaneous resending of the file concerned to all client terminals. Drawing 8 (c) is the example of combination of the above-mentioned example, performs simultaneous distribution only about a client terminal with many non-receiving blocks, and is made to perform individual resending to a client terminal with few non-receiving blocks.

[0030] Thus, the effectiveness of file distribution can be raised, being able to adopt a broadcasting method in a safe environment and mitigating the load of a server terminal or a channel, since the device which avoids that efficient recovery in case there being no guarantee of the risk in the case of adopting a broadcasting method, i.e., the sequentiality of wording of a telegram, at the client-server system of this operation gestalt and a wording-of-a-telegram omission occur cannot be performed etc. was realized. Moreover, since processing of this operation gestalt is automatable, the advantage of becoming possible to maintain intensively two or more client terminals of a remote place is also produced. In addition, although the above is explanation at the time of applying this invention to a client-server system, if it is the system which consists of the file transmit terminal which can adopt a broadcasting method, and a file accepting station, it cannot be overemphasized that this invention is similarly applicable.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block block diagram of a client-server system used as 1 operation gestalt of this invention.

[Drawing 2] The block block diagram of the client terminal which is 1 operation gestalt of this invention.
[Drawing 3] The explanatory view showing the example of a content of a serial number administration table.

[Drawing 4] The procedure explanatory view of the file message distribution processing by the server terminal.
[Drawing 5] The resending procedure explanatory view by the server terminal.
[Drawing 6] The procedure explanatory view of the receiving process by the client terminal.
[Drawing 7] The procedure explanatory view of the file store by the client terminal.
[Drawing 8] In the explanatory view of the resending mode by this operation gestalt, in (a), the example of individual resending and (b) show the example of simultaneous resending, and (c) shows the example of combination.
[Description of Notations]
10 Server Terminal
11 File Storing Memory of Server Terminal
12 File Management Section
13 Header Management Department
14 Block Editorial Department
15 Distribution Control Section
16 Transmitting Processing Section of Server Terminal
17 Reception Section of Server Terminal
18 Receipt Information Analysis Section
20a-20n Client terminal
21 Reception Section of Client Terminal
22 Receiving Block Monitoring Department
23 Memory Control Section
231 Table Control Section
232 Buffer Control Section
233 Write Control Section
24 Serial Number Administration Table
25 Buffer Memory
26 File Storing Memory of Client Terminal
27 Resending Demand Information Generation Section
28 Transmitting Processing Section of Client Terminal
30 Channel

[Translation done.]

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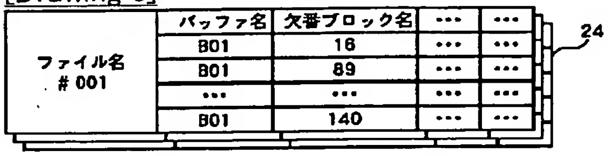
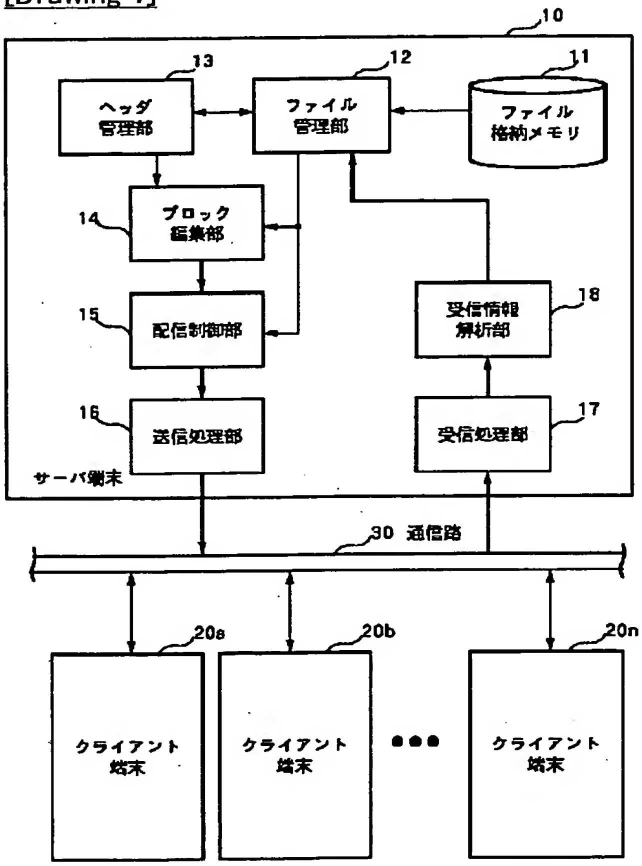
DRAWINGS

[Drawing 3]

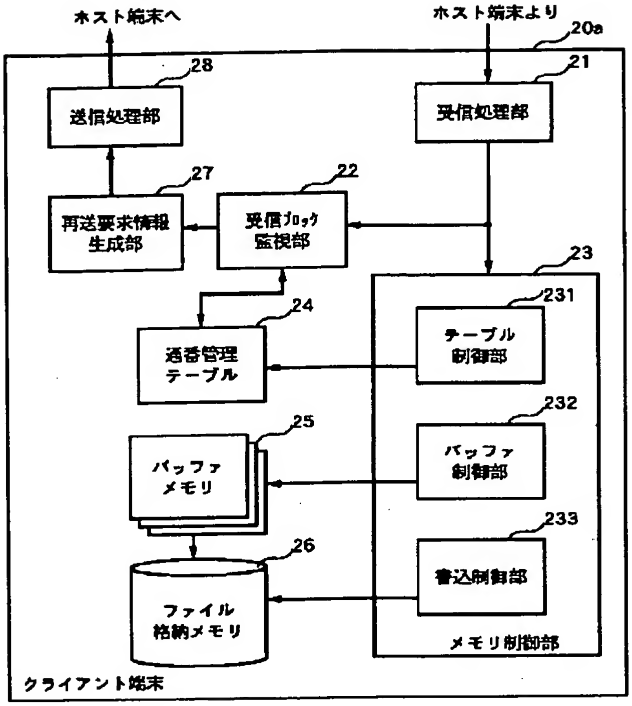


ファイル名 # 001	バッファ名	欠番ブロック名	•••	•••
	B01	16	•••	•••
	B01	89	•••	•••
	•••	•••	•••	•••
	B01	140	•••	•••

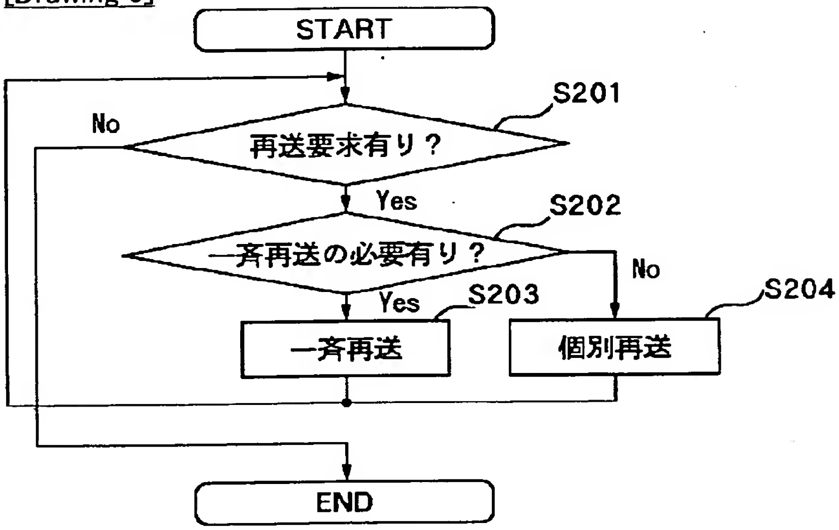
[Drawing 1]


10
13
ヘッダ
管理部
12
ファイル
管理部
11
ファイル
格納メモリ
14
ブロック
編集部
15
配信制御部
16
送信処理部
18
受信情報
解析部
17
受信処理部
サーバ端末
30 通信路
20a
クライアント
端末
20b
クライアント
端末
•••
20n
クライアント
端末

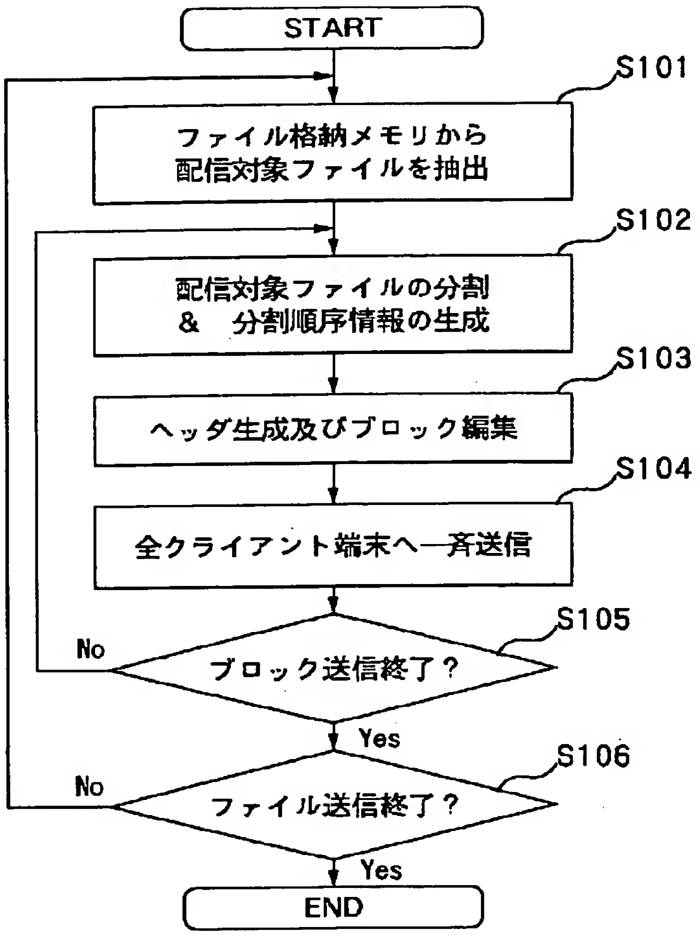
[Drawing 2]


ホスト端末へ
ホスト端末より
20a
28
送信処理部
21
受信処理部
27
再送要求情報生成部
22
受信ブロック監視部
23
231
テーブル制御部
24
通番管理テーブル
232
バッファ制御部
25
バッファメモリ
233
書込制御部
26
ファイル格納メモリ
メモリ制御部
クライアント端末

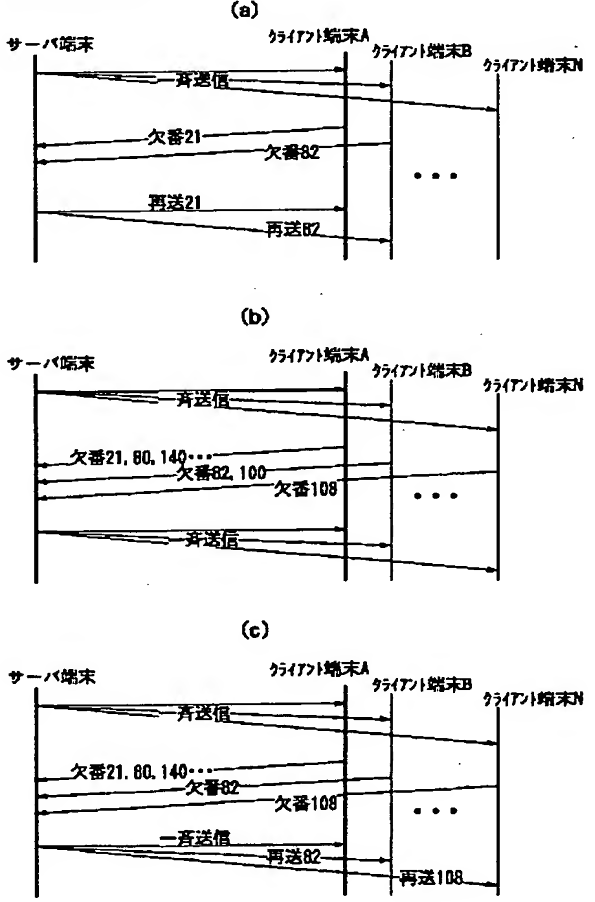
[Drawing 5]


START
S201
No
再送要求有り？
Yes
S202
一斉再送の必要有り？
No
Yes
S203
S204
一斉再送
個別再送
END

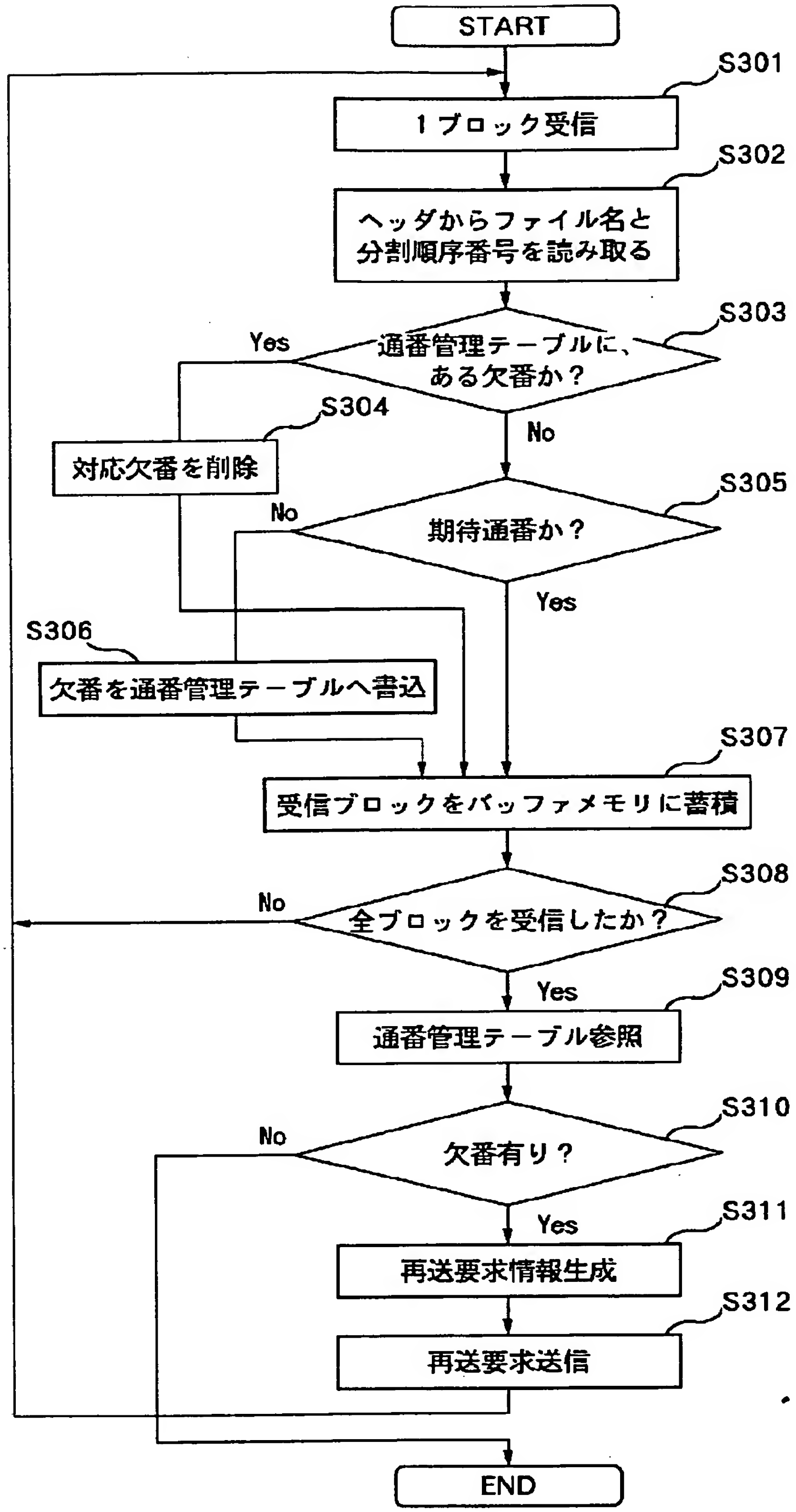
[Drawing 4]


START
S101
ファイル格納メモリから
配信対象ファイルを抽出
S102
配信対象ファイルの分割
&　分割順序情報の生成
S103
ヘッダ生成及びブロック編集
S104
全クライアント端末へ一斉送信
S105
No
ブロック送信終了？
Yes
S106
No
ファイル送信終了？
Yes
END

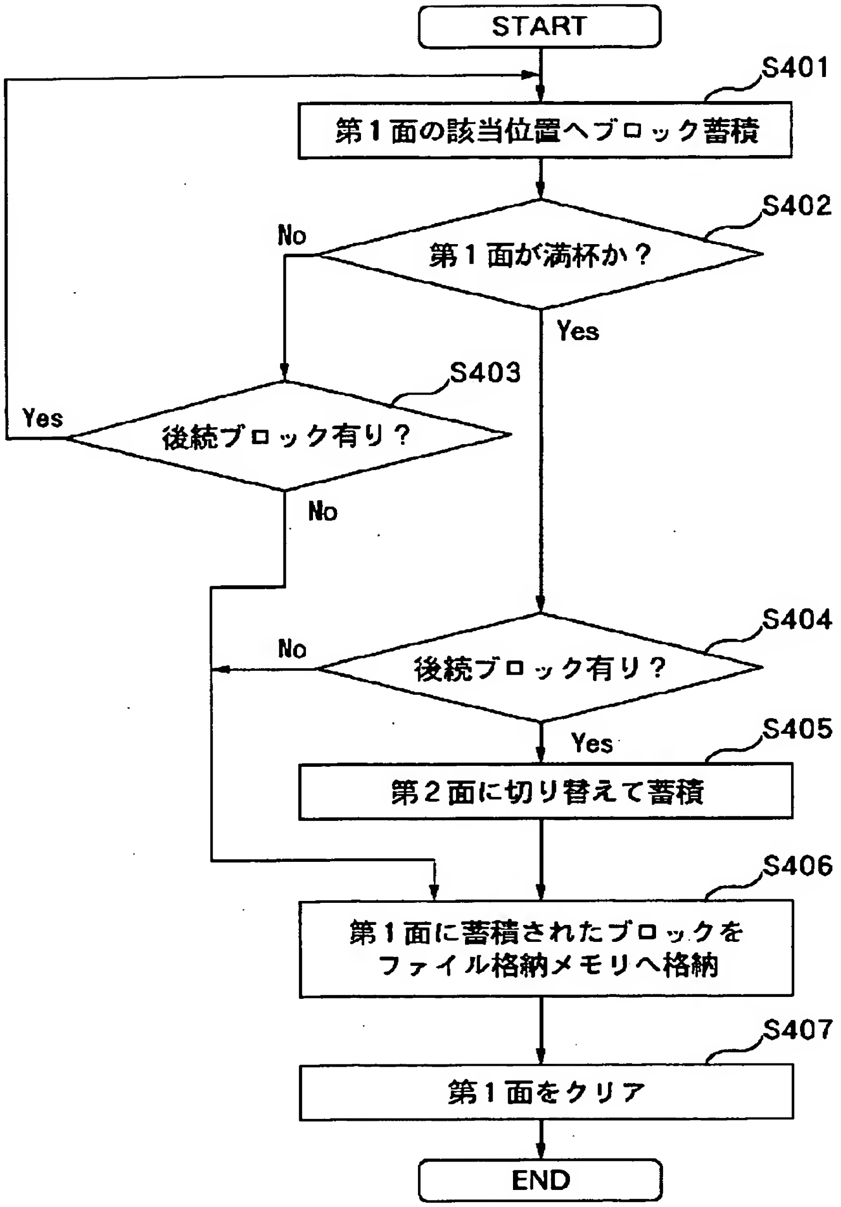
[Drawing 8]


(a)
サーバ端末
ｸﾗｲｱﾝﾄ端末A
ｸﾗｲｱﾝﾄ端末B
ｸﾗｲｱﾝﾄ端末N
一斉送信
欠番21
欠番82
・・・
再送21
再送82
(b)
サーバ端末
ｸﾗｲｱﾝﾄ端末A
ｸﾗｲｱﾝﾄ端末B
ｸﾗｲｱﾝﾄ端末N
一斉送信
欠番21, 80, 140・・・
欠番82, 100
欠番108
・・・
一斉送信
(c)
サーバ端末
ｸﾗｲｱﾝﾄ端末A
ｸﾗｲｱﾝﾄ端末B
ｸﾗｲｱﾝﾄ端末N
一斉送信
欠番21, 80, 140・・・
欠番82
欠番108
・・・
一斉送信
再送82
再送108

[Drawing 6]


START
S301
1ブロック受信
S302
ヘッダからファイル名と
分割順序番号を読み取る
S303
通番管理テーブルに、
ある欠番か？
Yes
No
S304
対応欠番を削除
S305
期待通番か？
No
Yes
S306
欠番を通番管理テーブルへ書込
S307
受信ブロックをバッファメモリに蓄積
S308
全ブロックを受信したか？
No
Yes
S309
通番管理テーブル参照
S310
欠番有り？
No
Yes
S311
再送要求情報生成
S312
再送要求送信
END

[Drawing 7]


START
S401
第１面の該当位置へブロック蓄積
S402
第１面が満杯か？
No
Yes
S403
後続ブロック有り？
Yes
No
S404
後続ブロック有り？
No
Yes
S405
第２面に切り替えて蓄積
S406
第１面に蓄積されたブロックを
ファイル格納メモリへ格納
S407
第１面をクリア
END

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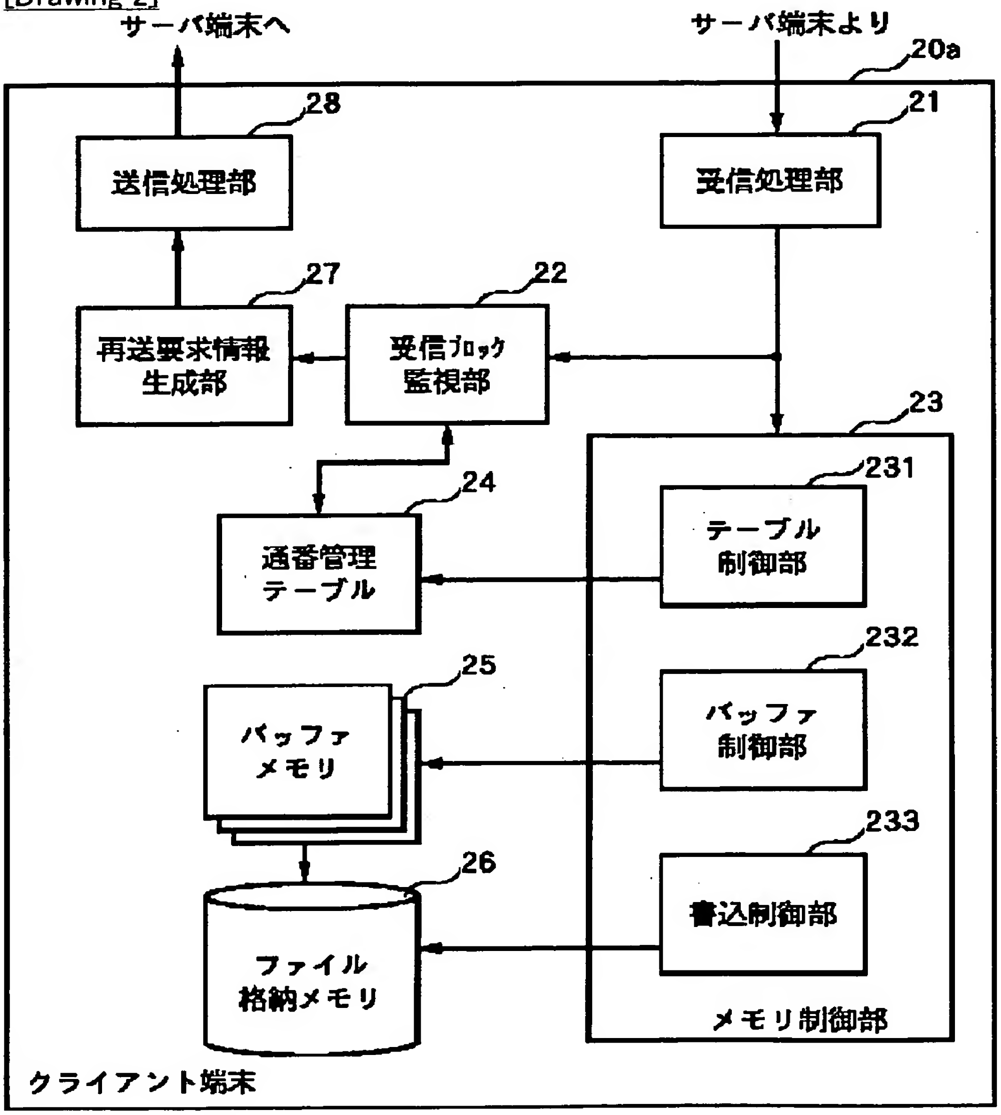
WRITTEN AMENDMENT

[procedure amendment]

[Filing Date] April 1, Heisei 8
[Procedure amendment 1]
[Document to be Amended] DRAWINGS
[Item(s) to be Amended] drawing 2
[Method of Amendment] Modification
[Proposed Amendment]
[Drawing 2]


サーバ端末へ
サーバ端末より
20a
28
送信処理部
21
受信処理部
27
再送要求情報生成部
22
受信ﾌﾞﾛｯｸ監視部
23
231
テーブル制御部
24
通番管理テーブル
25
バッファメモリ
232
バッファ制御部
233
書込制御部
26
ファイル格納メモリ
メモリ制御部
クライアント端末

[procedure amendment]

[Filing Date] July 25, Heisei 8
[Procedure amendment 1]

[Document to be Amended] Description
[Item(s) to be Amended] The name of invention
[Method of Amendment] Modification
[Proposed Amendment]
[Title of the Invention] The file distribution approach and a communication controller

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[Translation done.]